IN-HOSPITAL MORTALITY AND ITS PREDICTORS AMONG CRITICALLY ILL GERIATRIC PATIENTS PRESENTING TO EMERGENCY MEDICINE DEPARTMENT OF A TERTIARY HOSPITAL

Bahati James Msige, MD

‘‘A dissertation submitted in partial fulfillment of the requirement for degree award of Mmed Emergency Medicine of the Muhimbili University of Health and Allied Science’’

October, 2024

Muhimbili University of Health and Allied Sciences

School of Clinical Medicine

Emergency Medicine Department

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BY

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance a dissertation titled **"In-hospital Mortality and Its Predictors Among Geriatric Medical Patients Presenting to Emergency Medicine Department of Muhimbili National Hospital Upanga and Mloganzila Campus"**, in (partial) fulfillment of the requirements for the degree of Master of Medicine in Emergency Medicine of Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, **Bahati James Msige**, declare that this dissertation is my original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature……Date…….....….....

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DEDICATION

To the almighty God who made me a living miracle even after multiple falls.

To my lovely wife Engineer Theresia Sulley, and my children Hellen, Elvin, Harlyn, and Ellon for their patience and emotional support.

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ABSTRACT

Background: Geriatric patients represent a growing proportion of the presentations to the Emergency Medicine Department (EMD). Given the frequently complex nature of their underlying medical illnesses, this population presents particular challenges to clinicians. The predictors of 48-hour in-hospital mortality for those attending EMD must be considered for early identification and prompt and effective resuscitation to improve outcomes.

Objective: The objective of this study was to determine the 48-hour in-hospital mortality and its predictors among geriatric medical patients presenting to EMD of MNH Upanga and Mloganzila campus.

Methodology: This was a prospective open cohort observational study involving medical geriatric individuals 60 years and older triaged to resuscitation rooms, consented, recruited consecutively between October and December 2023. The study's ethical clearance was given by MUHAS IRB and MNH. The primary outcome was in-hospital mortality at 48 hours with EMD mortality and EMD Length of Stay (LOS) as the secondary outcome. Univariate regression analysis was performed and those variables with p value <0.05 were subjected to multivariate analysis to identify independent predictors of mortality.

Results: During the study period 13,957 patients presented to EMD, of whom 2,476 (17.7%) were geriatric individuals. Among the geriatric individuals, 436(17.6%) were triaged to the resuscitation room as emergency cases, whereas 293(67.2%) met the inclusion criteria for this study. The median age of study participants was 70 years IQR (65,76) more than half being males 174(59.4%). In-hospital Mortality at 48hours was 27(9.2%) with 6(2%) deaths occurring at EMD. Median EMD LOS was found to be 4 hours (238.5minutes). Independent predictors of mortality were found to be altered mental status (OR=2.96, 95% CI 1.24-7.06, P Value<0.014), difficulty in breathing (OR=2.41, 95% CI 1.08-5.37, P Value<0.031), Low SPO2 (OR=2.38, 95% CI 1.01-5.63, P Value<0.048) and electrolyte imbalance (OR=2.83,1.12-714, P Value<0.028).

Conclusion: The mortality rate in geriatric medical patients who presented to the EMD resuscitation room as emergency cases is high with altered mental status, breathing

difficulties, low oxygen saturation, and electrolyte imbalances being independent predictors of mortality.

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LIST OF ABBREVIATIONS

AMS	Altered Mental Status
CAM	Confusion Assessment Method
CPR	Cardiopulmonary Resuscitation
CVD	Cardiovascular Diseases
DAMA	Discharging Against Medical Advice
DRTC	Directorate of Research, Training and Consultancy
EMD	Emergency Medicine Department
4AT	Alertness, Abbreviated Mental Test, Attention and Acute changes or fluctuating course
GCS	Glasgow Coma Scale
ICU	Intensive Care Unit
IVF	Intravenous Fluid
IRB	Institutional Review Board
EMD LOS	Emergency Medicine Department Length of Stay
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences

DEFINITION OF KEY TERMS

Critical illness is a condition that puts one's life in danger and is predicted to result in death or major morbidity without medical care in this study it was used to indicate geriatric patients triaged to resuscitation rooms as very urgent or urgent by three-tier triage system thus emergency cases.

Geriatric patient; Indicates an older person. In Tanzania, geriatric individuals are considered age 60 years and more; however different countries have different age definitions. For this study, we use that from the setting of the study

Life expectancy is the average projected number of extra years a person should anticipate living if the "age-specific" death rate for a particular year persists throughout their lifespan. With age, there is typically a decline in the predicted lifespan of an individual.

Polypharmacy: in this study denotes the outpatient administration of more than are clinically necessary and/or the use of many medications, typically five or more prescribed medications per day, indicating unnecessary drug use.

STOPP; Screening tool of older people's prescriptions and (START) criteria screening tool to alert to the right treatment

CHAPTER ONE

1.0 INTRODUCTION

1.1Background

Due to improved lifespan in the world, there has been an increase in geriatric population in many countries, with much faster growth in the population seen in developing countries compared to developed countries(1). The Concise Report on the World Population Situation published by the United Nations in 2014 reported that geriatric individuals will make up 21% of the world's population by 2050 (2). Africa now has the lowest number and the lowest percentage of geriatric individuals in the population of any continent in the globe. However, He et al. in an International Population Reports article titled "Africa Aging: 2020" estimated that between 2020 and 2050, the number of geriatric Africans is projected to triple, from 74.4 million (5.6%of the population) to 235.1 million (9.3% of the population), outpacing the rise of the geriatric population in any other region in the world(3). WHO regional office for Africa in 2010 estimates that sub-Saharan Africa geriatrics population is projected to reach 67 million by 2025 and 163 million by 2050(4). The average annual growth rate of a population age 60 years and above in sub-Saharan Africa is over 2% and expected to double in the next 50 years(5). Tanzania's life expectancy has increased from 54years in 2002 to 67.3 years by 2022. Tanzania defines geriatric as 60 years of age and over; currently, 4.6% of the population is geriatric by this definition (6) and is anticipated to grow to 10.9% of the population by 2050(2).

Aging is associated with molecular and cellular changes resulting in a deterioration anatomically, physiologically, immunologically, and mentally among geriatric patients; hence they are vulnerable to single or multiple comorbidities(6) and have poor resilience to stressors such as illness or injury. A descriptive retrospective study by Benedict et al 2020, in South Africa indicated that the growing geriatric population in EMDs with their special needs, requires a special consideration(7). Another cohort study done retrospectively by Wilson et al. on elderly patients hospitalized in a teaching hospital's emergency medicine critical care units showed that there was a high incidence of emergencies in geriatric patients, and due to their

growing proportion in the population, geriatric patients accounted for an increasing share of attendance at EMD.

Furthermore, this study found that their attendances were often associated with a high level of urgency, overstaying at EMD, and high rates of poor outcomes (8). Understanding the 48-hour in-hospital mortality and its predictors in this population is important to enabling planning for geriatric emergencies in health policies and creating protocol formulations for EMD to guide the management of this population to improve outcomes.

1.2 Problem Statement

Due to improved life spans, there is a large increase in geriatric patients aged 60 or over globally(9). They are highly vulnerable to different diseases because of anatomical, physiological, and immunological changes associated with aging. Many present to the EMD with single or multiple comorbidities(8). Available data shows that a large proportion of geriatric patients frequently use EMD services. They consume more EMD resources as their multiple comorbidities require more complex evaluations, they stay longer in the EMD to attain stabilization before disposal, and they are frequently admitted.

The group has also a higher death rate than younger patients due to their underlying diseases and flair state(10). To provide them with proper care and properly use limited resources, emergency physicians need to understand more about the presentations, mortality, and the factors associated with mortality in this age group.

1.3 Conceptual framework

Description of the conceptual framework:

Potential predictors of mortality in geriatric medical patients at EMD MNH Upanga and Mloganzila include their age, sex, referral status, comorbidities, self-reported medication compliance, vital signs on arrival, presenting complaints, EMD diagnosis, length of EMD stay and whether they are disposed to home, ward and Management at EMD would influence their outcome. (Figure 1)

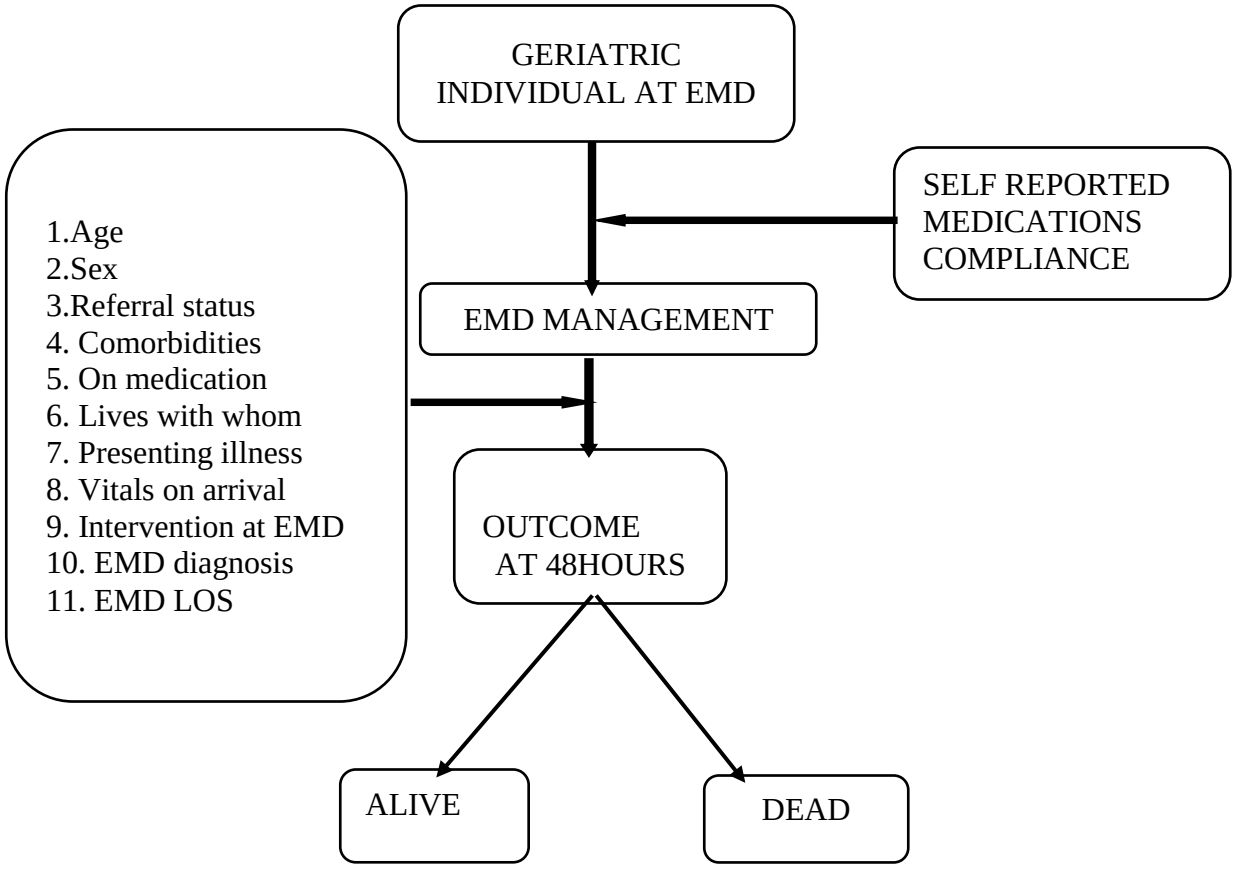


Figure 1: Conceptual Framework

1.4 Rationale of the study

Knowing the mortality rate and identification of its predictors in geriatric patients is crucial in planning for geriatric EMD comprehensive evaluation, early interventions, and informed management decisions. Scarce data are available in Tanzania detailing the outcomes and predictors of in-hospital mortality in a geriatric population presenting to EMD and triaged as very urgent and urgent to the resuscitation room(11). This study determined the types of complaints, clinical conditions, and outcomes of geriatric EMD patients and assessed which risk factors predict mortality so that interventions can be directed to those at higher risk. This study provides a foundation for subsequent research, utilizing it as a benchmark to assist in identifying potential gaps in geriatric healthcare. The data gleaned from this study will help with the execution of further training sessions for healthcare professionals as well as developing suitable clinical standards and protocols for geriatric patients.

1.5 Research Question

What are the 48-hour in-hospital mortality and its predictors among geriatric medical patients presenting to EMD MNH- Upanga and Mloganzila within three months?

1.6.1 Specific Research Questions

1. What is the proportion of geriatric medical patients presenting to MNH Upanga and Mloganzila EMD?
2. What is the clinical profile of geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila?
3. What are the management strategies of geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila?
4. What is the 48-hour in-hospital mortality of geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila?
5. What are the predictors of 48-hour in-hospital mortality among geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila?

1.7 Research Objectives

1.7.1 Broad research objective

To determine the 48-hour in-hospital mortality and its predictors among geriatric medical patients presenting to EMD MNH- Upanga and Mloganzila from October to December 2023

1.7.2 Specific research objectives:

1. To determine the proportion of geriatric medical patients presenting to the EMD MNH- Upanga and Mloganzila from October to December 2023
2. To describe the clinical profile of geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila from October to December 2023
3. To describe the management strategies of geriatric medical patients triaged to resuscitation at the EMD MNH- Upanga and Mloganzila from October to December 2023

4. To determine the 48hours in-hospital mortality of geriatric medical patients triaged to resuscitation at the EMD of MNH Upanga and Mloganzila **from** October to December 2023
5. To determine the predictors of 48hours in-hospital mortality among geriatric medical triaged to resuscitation at the EMD of MNH Upanga and Mloganzila from October to December 2023

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Proportion of geriatric medical patients presenting to EMD

There has been an increase in geriatric visits at EMD in tertiary hospitals(12). This increase has been attributed to extended lifespan and aging factors that make this population more vulnerable to different diseases as compared to young adults (13). A study done by Shah et al. using the National Hospital Ambulatory Medical Care Survey in the US on the epidemiology of older persons' utilization of emergency medical services indicated that geriatric patients used EMDs at a rate of 167 per 1000 people in a year, greater than four times that of younger patients(14). McCabe et al. in their review study done in UK EMDs in 2015 on acute care for geriatric patients showed that 20% of EMD visits were made by geriatric patients(15). According to data from the British Geriatric Society in 2011, 70% of emergency readmissions involved geriatric patients(15).

The same study found that those with chronic illnesses made up 55% of visits to general practitioners, 70% of emergency visits and outpatient appointments, and other appointments, making them the main consumers of healthcare services (15). Moreover, a cross-sectional study done from 2011 to 2013 by Kim et al. in Korea on elderly patients' unmet healthcare needs indicated that they had a wider range of unmet medical requirements than younger persons. Aging factors, which increase their vulnerability and likelihood of having disease or illness, thus must be taken into account(16). The study done by Fayyaz et al. retrospectively in Pakistan indicated that geriatric patients made up around 24% of the adults who visited the EMD, a higher percentage of them (57%) fell into the high-priority triage category compared with younger patients 35% (12).

Furthermore, a study in sub-Saharan Africa by Ambagtsheer et al. on frailty as linked to spending on health care and use of health services, showed that frailty was noted more in geriatric patients than younger patients which increased their EMD utilization and resource expenses(17) . Another descriptive retrospective study by Benedict et al. in South Africa found that geriatric patients made up 25% of EMD visits, with more than 53.7% being

categorized as high-priority(7). Additionally, a prospective study conducted in Tanzania at the tertiary hospital by Kiremeji et al. indicated that 13% of adult patients who visited EMD, were triaged as critically ill, were geriatric individuals(18). Therefore, integrative care is required to improve the outcomes for the geriatric because all aspects are organically related.

2.2 Clinical characteristics among geriatric medical patients presenting to EMD

Geriatric patients are biologically frail, a syndrome that is defined as " a condition of fragility brought on by cumulative, gradual physiological decreases in fitness and reserve across several body systems". Geriatric patients have multiple comorbidities which necessitate them to seek EMD services more frequently compared to the younger population(13). A retrospective cohort study by Fayyaz et al. in Pakistan indicated that shortness of breath and fever were the most common presentation by 13% and 9% respectively of geriatric patients (12). Another retrospective study by Wilson et al. on elderly patients admitted to a teaching hospital's emergency medicine critical care room reported that the geriatric population commonly reports to the EMD with hypertension, chronic liver diseases, malnutrition, depression, tuberculosis, pneumonia, AMS, and malignancy(8).

In a study from Turkey, Teslime et al found that diabetes mellitus was the leading cause of hospitalization by 18.3% among geriatric patients who attended EMD. Ninety point three percent of geriatric patients have one or more comorbidities which make their evaluation at EMD more complex, prolonging their stay(14)(15). Additionally, a prospective cohort study by Gbeasor-Komlanvi et al. in hospitalized geriatric patients from six hospitals in Togo found that chronic conditions like angina, osteoarthritis, and diabetes were not only becoming more common but also more than twice as common among geriatric patients than they were in younger patients(21).Geriatric patients are prone to polypharmacy with unsuitable prescriptions, for which there is a lack of clear proof of efficacy; this is likely due to multiple comorbidities and attendance to different specialty clinics(22).

The retrospective cohort study by Simakoloyi et al. on the characteristics of geriatric patients treated in the Cape Town district emergency center's resuscitation unit found that polypharmacy in geriatric patients was common, which put them at risk of adverse drug events

and interactions, functional and cognitive impairment. Some of those drugs were misused or had no valid medical use (23). There is limited published literature available in Tanzania that details the geriatric clinical characteristics of those presenting with EMD. Therefore, it is crucial to understand the EMD demographic and clinical presentation of this population to have early and targeted interventions for them

2.3 Management strategies among geriatric medical patients presenting to EMD

The provision of acute care to a geriatric patient population in a chaotic setting like the emergency department provides a special challenge (24). The Elderly Emergency Department Guideline by Hustey FM et, al, in 2003 from the US on mental health state assessment and treatment of geriatric emergency department patients states that delirium is more common in geriatric patients(24). It has been shown that during management delirium is misdiagnosed by 76-84, the repercussions of not recognizing it affect prognosis, with greater mortality withing 3 month (24). Kalra S et al, in their study on fluid and electrolyte Imbalance in Geriatrics: The Need for Optimal Hydration, showed that dehydration is a prevalent issue in geriatric individuals receiving concurrent treatments, one that frequently goes undiagnosed while being a persistent sickness sign(25). Another study by Tsiompanou et al, 2013, in England on Lessons from The Liverpool Care Pathway Regarding Overfeeding and Overhydrating in geriatric medical patients recommended that geriatric patients who are vulnerable shouldn't be subjected to nil per oral except in extreme cases because of refeeding syndrome(26). A study by Giarratano et al, on a review of antimicrobial use in geriatric patients in the US found that several factors, including prolonged and more frequent interactions with the healthcare systems, immune-suppressing chronic diseases, immunosenescence brought on by normal aging, and use of medical devices like indwelling catheters that are susceptible to bacterial colonization, increased the likelihood of geriatric patients developing drug-resistant bacterial infections (27).

The standard emergency medicine textbook ‘’Rosen’s Emergency Medicine: Concepts and Clinical Practice, tenth edition’’ shows that pharmacokinetics and pharmacodynamics are different in geriatric patients; doses often need to be adjusted to avoid drug toxicity(28).

Possibly problematic drugs can be identified using published lists of possibly unsuitable pharmaceuticals, such as the Beers list and the STOPP and START criteria. Only a few studies have been conducted that have allowed the extrapolation of this algorithm to the EMD context(29). Multiple diseases are challenging to manage. According to Fried TR and Mecca MC review of randomized clinical trials on appropriate medication prescription in vulnerable geriatric patients indicated that handling critical illnesses becomes more difficult as the number of these illnesses increases. Delays in diagnosis at the EMD are frequently caused by co-morbidities and several drugs changing the clinical presentation of the diseases(22). Therefore, avoiding polypharmacy can help to improve geriatric health and their quality of life.

2.4 In-hospital mortality in Geriatric medical patients presenting to EMD

Due to functional decline, physical disease, and psychosocial demands, geriatric persons frequently have more complex healthcare needs. In a recent survey by Karamercan et al. of 36 EMDs in nine European nations, 51% of all geriatric patients attending EMD were admitted, with 9% admitted to an intensive care unit (ICU), one percent of deaths occurred in the EMD, and overall in-hospital mortality was 8%(30). Another prospective cohort study by Kelly et al. from multiple centers in Australia and Asia found that, of geriatric patients presenting with dyspnea at EMD, 82.6% were admitted to the wards, with 2.5% of those patients admitted to ICU. ICU patients had a death rate of 7.9%(31).

In contrast, a retrospective cohort study by Lankonde et al. in Burkina Faso sub-Saharan Africa revealed that the death rate for geriatric patients who are admitted to ICU from EMD was 73%, and 90% of deaths occurred within 7 days after admission(32). In Tanzania, a prospective study done by Tumaini et al.2019 on admitted geriatric patients at two tertiary hospitals revealed that the in-hospital mortality rate among geriatric patients was 25.6%. with a higher rate among those admitted to the ICU, likely because they are more severely ill(33). Thus, our settings need to be aware of the in-hospital mortality rate and understand why it might be higher than in high-income countries and how we can lower that rate.

2.5 Predictors of in-hospital Mortality in geriatric medical patients presenting to EMD

In general, age is an important risk factor for recurrent admissions and mortality in emergency departments. A retrospective study done by De Matteis et al. in Rome Italy evidenced that cardiac mortality increased linearly with age, and the clinical parameters of acute decompensated heart failure (ADHF) changed significantly with age(34). In-hospital mortality was greater in very senior geriatric patients aged 85 years despite a higher rate of retained systolic function. Another retrospective study by Boonmee et al in Bangkok Thailand indicated that increasing age, do not resuscitate status, recent history of admission, airway infections, systolic blood pressure lower than 100, level of oxygen, and level of consciousness predicted in-hospital mortality in this age group (35).

When compared to geriatric patients with non-malignant neoplasia at EMD, geriatric patients with malignant neoplasia have higher risks of being admitted and dying. A 2018 retrospective study on the effects of underlying malignant neoplasia on emergency room use and outcome as studied by Qian et al in the U.S.A, showed that geriatric malignant neoplasia patients constituted 59.7% of EMD visits compared to 23.6% of non-cancer patients, with 16.6% likely to die at EMD or in-hospital compared to 7.9% in non-cancer geriatric patients(36). Another retrospective study by Mizuno et al. between 2007 to 2011 on Clinical Characteristics, Treatment, and Mortality in Advanced Age Geriatric Patients with Acute Decompensated Heart Failure Who Are Hospitalized found that, there is an age-related increase in total in-hospital mortality among geriatric ADHF patients(37). A prospective observational cohort study done from 2004 to 2007 by Silva et al. in Brazil on Age-related predictors of in-hospital mortality in geriatric patients showed that geriatric patients who were admitted with immobility history, abnormal protein levels, kidney injury, or heart failure were more likely to die(38).

Another study by Gbeasor-Komlanvi et al. in Togo sub-Saharan Africa indicated that the hospital level of the health pyramid, hospitalization services, duration of stay, functional impairment, depression, and malignant diseases were all linked to 3-month mortality(21). In Tanzania, Tumaini et al. in their prospective study at MNH and JKCI from October to

December 2017 showed that a modified Barthel index score which is used to evaluate the functional status of patients at admission and discharge, below 20 at the time of admission was also linked to mortality and can be used to find patients who need extra care(33). Therefore, understanding predictors of in-hospital mortality rate in this group of age is paramount so that, risk stratification can be done, and actions can be tailored to improve outcomes.

CHAPTER THREE

3.0 METHODOLOGY

3.1Study Design

It was a prospective observational cohort study of geriatric medical patients 60years of age and older presenting to the EMD of MNH Upanga and Mloganzila campus conducted from October to December 2023

3.2 Study setting

The sites of this project were the EMD MNH Upanga and Mloganzila in Ilala and Ubungo districts, respectively Dar Es Salaam, Tanzania. The largest commercial city in Tanzania, Dar Es Salaam, is home to MNH, a tertiary government-owned hospital The EMD MNH Upanga campus has been in operation since 2010 and is the first emergency medicine department with a full capacity in the nation. The EMD serves more than 60,000 patients annually on average. It offers care for critically ill patients with potentially fatal conditions by stabilizing and managing them for up to 24 hours before transferring them to an inpatient unit, intensive care unit, outpatient clinic, or, if necessary, a medical evacuation for additional diagnostic testing and treatment. Emergency specialists staff it, residents in training with local and international training work at EMD MNH Upanga and Mloganzila, registrar doctors, nurses, medical attendants, cleaners, cashiers, and security guards, The EMD comprises an ambulance bay, triage area, resuscitation rooms, a designated space with ultrasound, a mass casualty section, and an emergency theater for emergency surgical needs. It also provides resuscitation rooms for adult and pediatric patients with respiratory or circulatory impairment, polytrauma, or cardiac arrest. The space also includes an oxygen supply and crash carts.

MNH Mloganzila (MAMC) is a national specialty and super specialty hospital as well as Tanzania's leading hub for healthcare professional education, service delivery, and research. The facility has 1,500 beds and can accommodate 1,000–1,200 outpatients and 1,000–1,200 inpatients per week. It was formally opened on November 25, 2017. MAMC is a government-owned hospital that provides medical care to patients from across the United Republic of Tanzania who are recommended by national and regional referral hospitals. Situated in

Mloganzila, 3 km off the Dar Es Salaam (DSM)-Morogoro highway, it boasts a state-of-the-art emergency medical department and occupies 3,800 acres.

3.3.0 Study Population

3.3.1 Target study population

All medical patients 60 years and older presenting to acute care settings in Tanzania

3.3.2 Accessible study population

All medical patients 60 years and older presenting to the EMD MNH-Upanga and Mloganzila

3.3.3 Population of Study

All medical patients 60 years and older presenting to the EMD MNH-Upanga and Mloganzila campus who were triaged to resuscitation and consented to participation at the time of the study.

3.3.4 Sampling technique

Consecutive enrollment of medical patients 60 years and older presenting to EMD MNH-Upanga and Mloganzila campus triaged to resuscitation was done.

3.4 Eligibility

3.4.1 Inclusion criteria

All medical patients 60 years and older presented to EMD MNH-Upanga and Mloganzila campus and triaged to resuscitation rooms. Patients or if unable to consent, caretakers who gave informed consent

3.4.2 Exclusion criteria

All geriatric patients who were brought in cardiac/respiratory arrest and all geriatric trauma patients

3.4.3 Study participant recruitment procedures

Research assistants were present in EMD for a twelve hours shifts day and night every week. Geriatric patients who were triaged by a trained triage nurse to resuscitation room for critical intervention were screened for eligibility, consented and consecutively enrolled. All study participants received standardized care as per emergency medicine intervention protocols from the attending physician. The research assistants recorded intervention performed in the EMD.

The primary diagnosis and disposition plan was made by the attending EMD doctor. All study participants were followed for 48hours as per study design.

3.5.0 Variables of interest

3.5.1 Independent variables

1. Demographic information
- Age in Years
- Sex (Male / Female)
- Referral status (Self-Referred /from District /Regional/Zonal/Private Hospital)
- Insurance status (Insured/Not Insured)
- Duration of symptoms before arrival at EMD
2. Comorbidities
    - Diabetes Mellitus (DM)
    - Hypertension (HTN)
    - Malignancy (any)
    - HIV/AIDS
    - Chronic kidney disease/ESRD
    - C.O.P. D
3. Whether on longstanding medication
4. Self-reported medication compliance
5. Vital indicators, including respiration, pulse rate, blood pressure, oxygen saturation, temperature, at the time of study and random blood glucose
6. Symptoms
7. Management plan at EMD: investigations, procedures, drugs and fluids
8. Disposition diagnosis
9. Disposition point (Ward, discharged home, DAMA, died at EMD)
10. Length of stay at EMD

3.5.2 Dependent variables

Primary outcome

- All-cause in-hospital (48hour) Mortality occurring within the period of study

Secondary outcome

- Compliance with longstanding prescribed medications as self-reported
- EMD mortality
- EMD length of stay

3.6 Sample size estimate

The sample size was based on the assessment of the predictors for mortality. A prospective observational study conducted in Sao Paulo, Brazil's top university hospital (35) found that among 856 geriatric patients,140 died. In the population studied, 191 had cancer, and 58 died with a mortality rate of 30%; 649 had no cancer 82 died with a mortality rate of 12.6%, with an odds ratio of 2.75 times higher death among those with cancer. Therefore, calculated sample size from a two-proportion comparison formula for cohort studies by Charan J and Biswas T. published in 2013(39) as below;

$$N = \frac{z\alpha\sqrt{P(1-P)(1/q1 + 1/q2)} + z\beta\sqrt{P1(1-P1)(1/q1)} + P2(1-P2)(1/q2)^2}{(P1-P2)^2}$$

The standard normal deviate for α = Zα = 1.9600

The standard normal deviate for β = Zβ = 0.8416

Pooled proportion = P = (q1*P1) + (q2*P2) = 0.1659

A = Zα√P(1-P) (1/q1 + 1/q2) = 1.5910

B = Zβ√P1(1-P1) (1/q1) + P2(1-P2) (1/q2) = 0.7586

C = (P1-P2)2 = 0.0234

Total group size = N = (A+B)2/C = 236

Continuity correction (added to N for Group 0) = CC = 1/ (q1 * |P1-P0|) = 22
10% adjustment of dropout gave a total of 284 subjects

Sample size

The minimum number of study subjects was 284 participants

3.7.0 Management of data

Enrollment and Screening

Data was gathered every hour of the day, every day of the week. The primary investigator and/or research assistants were on hand in the emergency room during the study's period for subject screening and enrollment. Every patient examined in the resuscitation room had their age checked in the electronic medical record (in Well soft) by the principal investigator and/or research assistants. Once eligible, were evaluated for inclusion and exclusion requirements. The number of patients who were screened but did not satisfy the inclusion criteria was counted, but no more clinical data was gathered. Patients who fit the criteria for inclusion were asked for permission.

Standardized data collection tool

When a patient arrived at EMD MNH-Upanga and Mloganzila after giving their consent to be included in the study, the principal researcher or a trained assistant researcher completed a case report form (CRF) to collect data from the treating physician and information from the electronic medical record (Well soft) prospectively. Redcap Version 6.0.1 from Vanderbilt University, Tennessee, USA was used. The following information was gathered: demographics, clinical findings, EMD management, investigations, and the results, as well as disposition. No specimen was drawn from the study subject for the study; only the available laboratory tests and results which were ordered by the attending doctor were considered enough to gather the information needed. To ascertain the outcomes of the enrolled patients' EMD and ward stays during the study period, these outcomes were tracked in the admitting units and recorded on the CRF.

Tool testing

The CRF was transformed into Redcap, the online platform used to acquire the needed data, and two research assistants received training on how to use it. The case report form was pre-tested to get information from the patients who were present at the EMD before the period of data collection began after the research assistants had understood how to use the Case Report Files. This process identified and fixed issues that arose.

Data Analysis

IBMSPSS version 26 statistical software was used to import and analyze the RedCap (Version 6.0.1, Vanderbilt University, Tennessee, USA) data after transforming it into an Excel file (Microsoft Corporation, Redmond, WA, USA). The collected information was entered into a computer and examined with the software. Data are presented as proportions and frequency tables for categorical variables. The first objective; the proportion of geriatric patients attending EMD was calculated by taking the number of geriatric patients attending EMD divided by the total number of patients presenting to EMD during the study period. The second objective, the frequency distribution table was used to summarize the clinical characteristics of geriatric patients who were prioritized for resuscitation as an emergency. The frequency distribution table was utilized to outline management methods for geriatric patients who were prioritized for resuscitation in the third aim. The fourth objective, the predictors of 48-hour mortality were determined using measures of association of logistic regression. The significance of relationships between the predictor and outcome variables for categorical variables was assessed using the chi-square test. To evaluate independent causes of mortality, multivariate logistic regression analysis was employed. Variables with a P-value less than 0.05 indicated statistical significance together with those that were found to have causal effects imported to multivariable logistic regression.

Ethical consideration

The MUHAS Senate of Research and Publication Committee was contacted to obtain this project's ethical approval from IRB. To obtain permission for data collection, the appropriate MNH personnel for research activities were approached. The research assistant or principal investigator obtained the patient or patient's relative or next of kin's permission in cases of

patients who were confused, distressed, or in pain. Data collection didn't start until a patient, or a patient's proxy, had consented to take part in the study. The structured surveys were identified by serial numbers, and the patient's medical records were given a folio number rather than their names. the use of a patient's medical record number to maintain track of study-related patient data in case it's essential to recheck the record for errors or missing information. Other than study assistants or co-investigators, the questionnaire responses were not shared. There was no patient involvement in invasive procedures even though this was a prospective cohort study.

Compensation of participants*:* Participants were not compensated for participating in the study.

Potential study risks: There were no interventions by the study and therefore no physical harm to the patients.

Potential benefits to study participants: The findings gleaned from this study will help with the execution of further training sessions for healthcare professionals as well as suitable clinical standards and protocols for geriatric patients.

CHAPTER FOUR

4.0 RESULTS

4.1 Proportion of geriatric medical patients presenting to EMD MNH-Upanga and Mloganzila.

During the period of study, 13957 patients attended EMD MNH-Upanga and Mloganzila campuses. Among them, 2476 (17.7%) were aged 60 years and older. Of these, 436(17.6%) patients were triaged to resuscitation rooms as critically ill patients. After exclusions, 293(67.2%) were included in the study. (Figure 2)

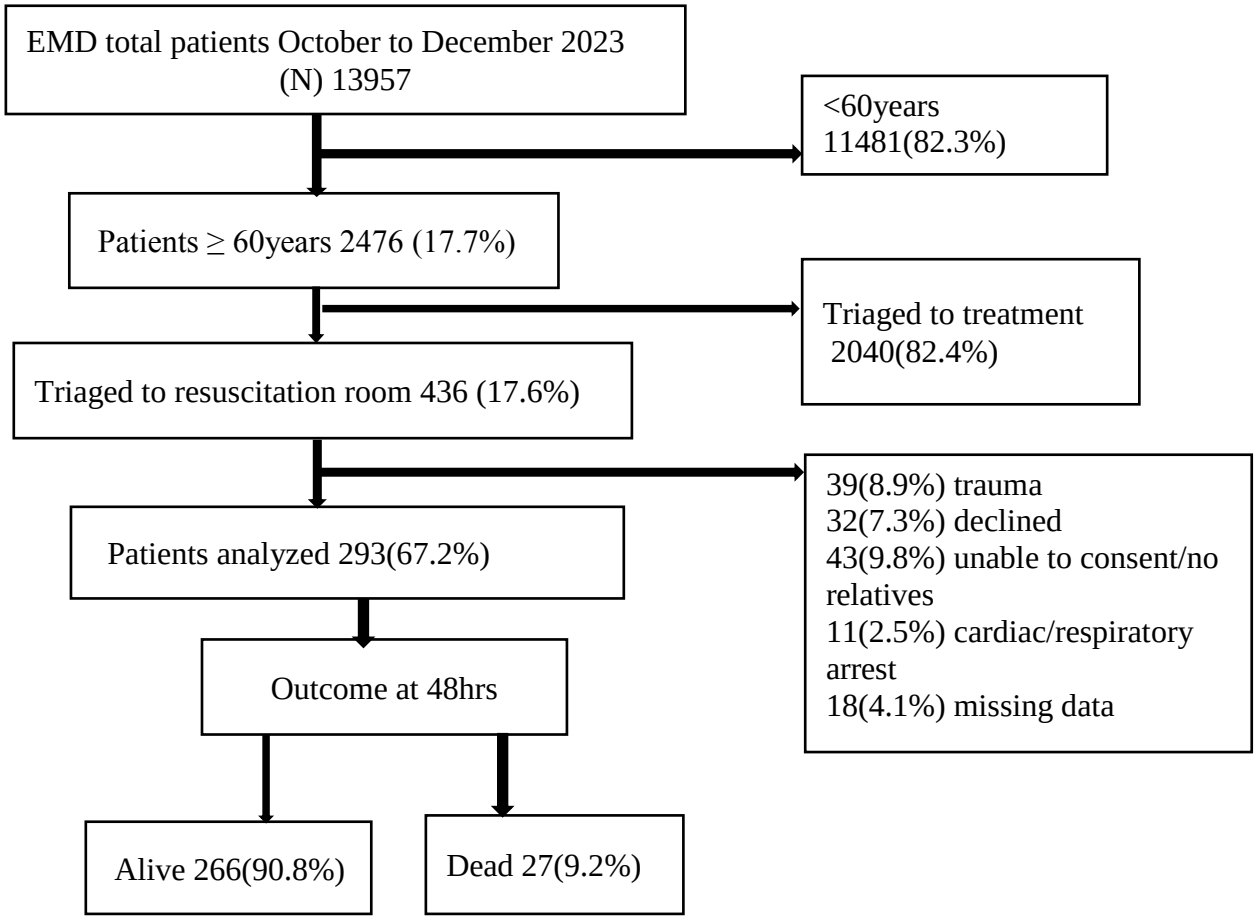


Figure 2: A flow chart of geriatric medical patients presenting to the EMD MNH - Upanga and Mloganzila

4.2 Clinical characteristics of geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila.

The median age was 70years, most of study participants were males 174(59.4%), 62.1% were self-referral, 234(80.7%) living with their families, 158(54.1%) were insured of which 98.7% from NHIF. Antihypertensive and diabetic mellitus medication were the most common ones being taken by 137(46.6%) and 33(11.6%) respectively, and 144 (73.1%) reported to be taking them regularly. (Table 1)

Table 1 Clinical characteristics of geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila

Variable	Frequency (n)	Percent (%)
Age group (years)		
60 – 65	86	29.4
66 – 70	67	22.9
>70	140	47.8
Median age in years (IQR)	70 (65, 76)	
Sex		
Male	174	59.4
Female	119	40.6
Live with (n = 290)		
Family	234	80.7
Wife	31	10.7
Alone	8	2.8
Husband	14	4.8
Referral status		
Self-referral	182	62.1
Referral from dar es salaam & other region	111	37.9
Insurance status		
Insured	158	54.1
Not insured	135	45.9
Insured by (n = 158)		
NHIF	155	98.7
Others	3	1.3
On medication n(197)		
Antihypertension	137	69.5
DM medication	33	16.8
Others	27	13.7
Frequency of taking medication (n = 197)		
Always	144	73.1
Not always	53	26.9

NB; Referrals from regional referral hospitals in Dar Es Salaam; Mwananyamala 25.2%, Temeke 8.1%, Amana 6.3%, Other regions made 60.4% of all referrals

Among the comorbidities to the study participants, the most common were hypertension and diabetes mellitus. Chronic kidney disease (ESRD), malignancy, and stroke were less common. (figure 3)

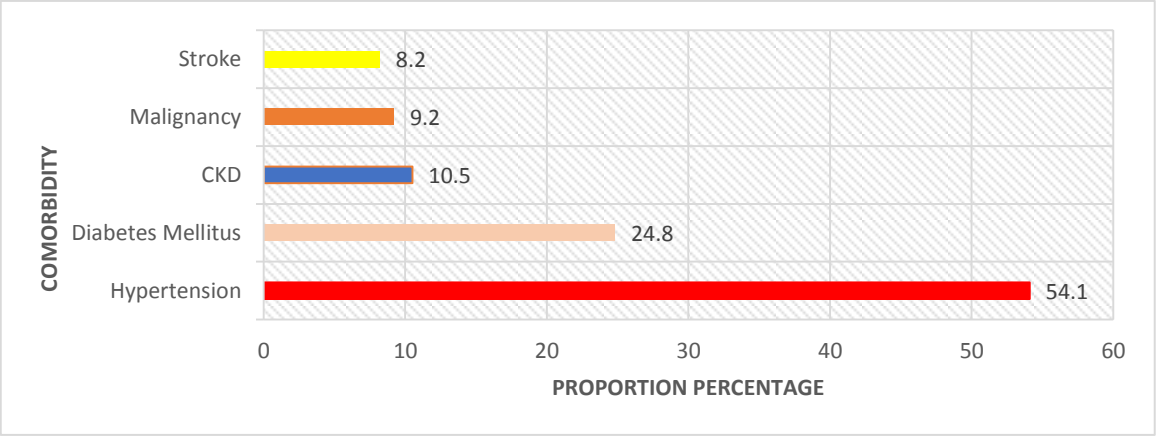


Figure 3 Comorbidities among geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila.

Among the patients enrolled, the most common complaint, 29.6% was difficulty in breathing followed by altered mental status 18.7% and general body weakness 18.0% and 8.2% had fever. Others were having complaints like decreased urine output, vomiting, jaundiced, chest pain, and unilateral body weakness constituting 25.5% in total (Figure 4).

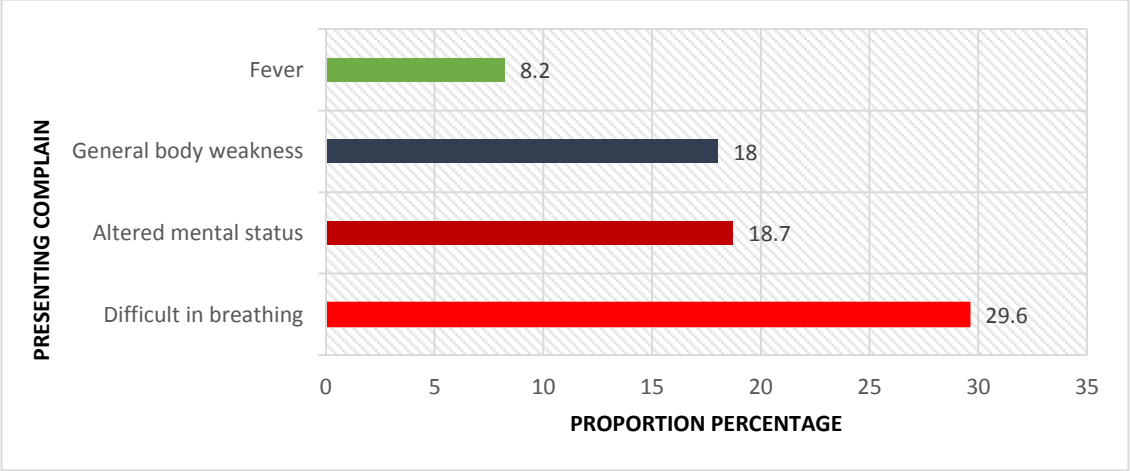


Figure 4 Presenting complaints of geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila

On vital signs, enrolled patients had median systolic blood pressure (SBP) of 137, having IQR (113.0, 156.0) and diastolic blood (DBP) of 71.0, with IQR (60.0, 83.0). The median heart rate was 92.5 and the oxygen saturation 98.0, others as observed in figure 5.

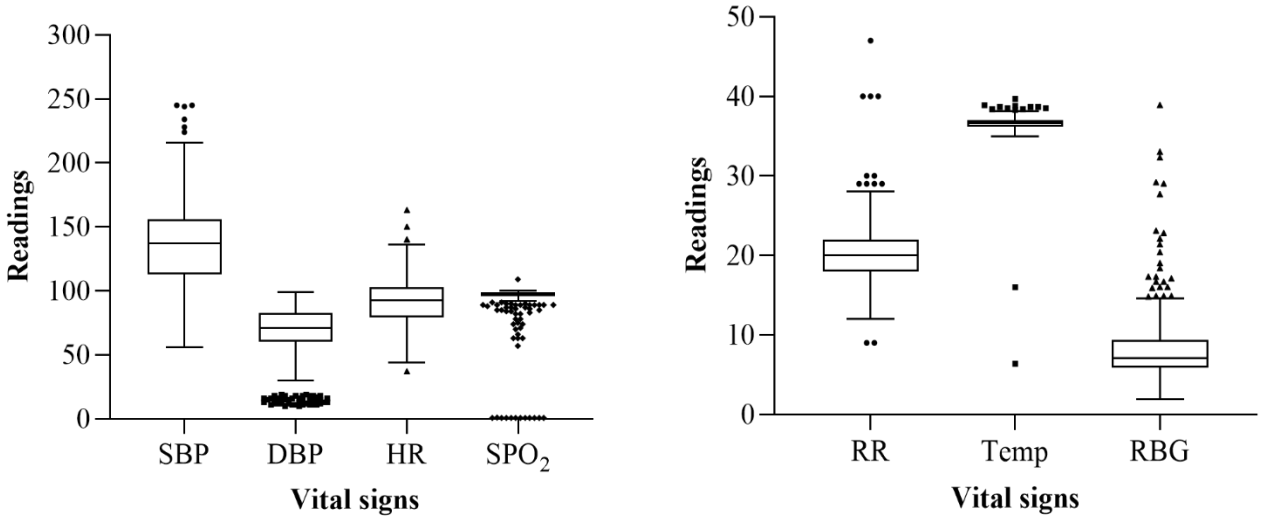


Figure 5: Box Plot of vitals signs of geriatric medical patients on arrival at the EMD MNH-Upanga and Mloganzila

Among the enrolled patients, many were diagnosed with renal insufficiency and malignancies 21.1% and 17.3% respectively. Sixteen percent had pneumonia, while electrolyte imbalances were 15.9%. (Figure 6 below)

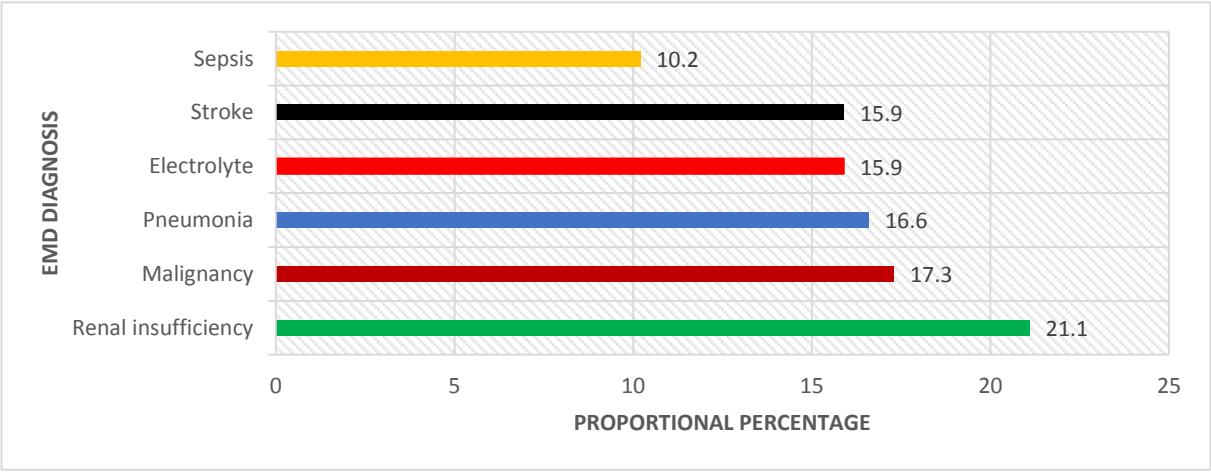


Figure 6 Diagnoses of geriatric medical patients upon admission to the EMD MNH-Upanga and Mloganzila

4.3 Management strategies of geriatric medical patients presenting to the EMD MNH-Upanga and mloganzila

About 32(10.9%) of the total enrolled patients were discharged. and roughly 252 (86.0%) were admitted. Three patients 1% were sent home against medical advice (DAMA). Of the 27(9.2%) deaths in 48 hours, 6(2.1%) happened at EMD. Table 2

Table 2 Treatment outcomes of geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila.

Variable		Frequency (n)	Percent (%)
Outcome at EMD			
	Discharged	32	10.9
	Admitted	252	86.0
	Died	6	2.1
	DAMA	3	1.0
Outcome at 48hrs			
	Alive	266	90.8
	Died	27	9.2

Antibiotics were administered to 153(53.5%) of elderly medical patients; the most often prescribed medications were metronidazole and ceftriaxone. Twenty point two percent of 59 patients received oxygen support. (Table 3)

Table 3 Management strategies of geriatric medical patients at EMD MNH-Upanga and Mloganzila.

Variable	Frequency (n)	Percent (%)
IV-line placement		
Yes	283	97.3
No	8	2.7
Dextrose bolus 50		
Yes	17	5.8
No	275	94.2
Given antibiotic		
Yes	153	53.5
No	133	46.5
Type of antibiotic (n = 153)		
Given Ceftriaxone	123	80.4
Given Ceftriaxone Salbactum	14	9.2
Given Metronidazole	112	73.2
Given Ciprofloxacin	6	3.9
Given other antibiotics	17	11.1
Urinary catheter placement		
Yes	143	49.7
No	145	50.3
Oxygen support		
Yes	59	20.2
No	233	79.8
Other management		
Yes	67	23.6
No	217	76.4

4.4 Predictors of 48hours in-hospital mortality among geriatric medical patients presenting to EMD MNH Upanga and Mloganzila

Logistic regression reveals significant differences between variables of difficulty in breathing(DIB), altered mental status, low oxygen saturation levels and those who stayed longer than those with no such clinical profiles. Other variables had no significant differences. Table 4

Table 2 Predictors of 48-hour mortality among geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila

		Univariable analysis		
Variable	**Category**	**Cor**	**95% CI**	**p – value**
Age group (years)	>70	1.09	0.46 – 2.59	0.846
	66 – 70	0.26	0.05 – 1.25	0.092
	60 – 65	Ref		
Sex	Male	1.40	0.61 – 3.23	0.433
	Female	Ref		
Medication	Yes	0.88	0.40 – 1.96	0.756
	No	Ref		
Difficulty in breathing	Yes	2.41	1.08 – 5.37	**0.043**
	No	Ref		
Altered mental status	Yes	2.89	1.24 – 6.72	**0.027**
	No	Ref		
SPO2	Low	2.40	1.04 – 5.54	**0.041**
	Normal	Ref		
Electrolytes imbalance	Yes	1.32	0.37 – 4.70	**0.053**
	No	Ref		
Renal insufficiency	Yes	0.52	0.12 - 2.27	0.382
	No	Ref		
Length of stay at EMD	Prolonged	2.56	1.002 – 6.55	**0.049**
	Short	Ref		
Diabetic complication	Yes	0.92	0.20 – 4.17	0.918
	No			

According to multivariate regression, geriatric medical patients who experienced respiratory difficulties had a 2.41-fold higher mortality rate than those who did not, and those who had altered mental status had a 2.96-fold higher chance of dying. The risk of death for patients with low oxygen saturation levels was 2.38 times higher than that of patients with normal values. (Table 5)

Table 5 Multivariate analysis of predictors of 48-hour mortality of geriatric medical patients presenting to the EMD MNH-Upanga and Mloganzila

Variable	aOR	95% CI	p-value
Altered mental status	2.96	1.24 – 7.06	**0.014**
Difficulty in breathing	2.41	1.08 – 5.37	**0.031***
SPO2 low level	2.38	1.01 – 5.63	**0.048**
Electrolytes imbalance	2.83	1.12 – 7.14	**0.028**
EMDLOS	2.01	0.71 - 5.68	0.186

Key: aOR: adjust Odds Ratio, Ref: Reference Category, *Variable has collinearity with SPO2

CHAPTER FIVE

DISCUSSION

This study determined a 48-hours in-hospital mortality and its predictors among geriatric medical patients presenting to emergency department of tertiary hospitals. The study documented a mortality of 92 deaths per 1000 patients including 21 deaths per 1000 patients that occurred at EMD among geriatric medical patients triaged as emergency cases and admitted to the hospital through the EMD, with the assumption that results beyond this specified period of study would not reflect EMD stabilization procedures(40)(41). It is higher than what is documented by Karamercan et al. from 36 EMDs in nine European nations, which indicated that only 10 deaths per 1000 patients occurred in the EMD, and overall in-hospital mortality was 80 death per 1000 patients(30). Our study documented higher in comparison to their study probably due to that, it was done in a tertiary hospital which receives referrals of most critical ill patients from lower health facilities all over the country. Also age definition of geriatric population between lower income countries and higher income countries is different (60years vs 65years) of age and beyond (42)(9).These findings are not consistent with a study from South Africa by Adebusoye and Kaula in 2019 showing that 32 per 1000 occurred at EMD(43). The differences may be due to duration, type of study and number of sample size included, prospective against their retrospective

The result of this study showed that there is high presentation of geriatric patients to EMD. These findings are consistent with a study by Ambagtsheer et al. 2021 that showed a growing number of geriatric patients being admitted to EMDs and that geriatric patients are increasingly accessing EMDs in sub-Saharan Africa(17). Also, McCabe et al. in their study done in UK EMDs in 2015 on acute care for geriatric patients showed that 20% of EMD visits were geriatric patients(15). The consistence's is due to increasing life expectancy that keeps growing of geriatric population with physiological deterioration all over the world. However, a multicentre study by Strange et al. indicated that 15% of geriatric patients were using the EMD which is lower than of our findings 17.7%(44). This may be due to the implementation of early disease screening programs and specialized clinics versus delays in our settings Williams et al 2023(45). In the future, providing acute treatment to this susceptible group in a

busy setting will become more challenging. We must evaluate the emergency medical resources required to care for the geriatric population given its rapid expansion.

The median age of the study participants was 70 years, with 59.4% being males, the population of the study had a high proportion of hypertension, diabetic mellitus, chronic kidney disease(ESRD), and malignancy. The information is consistent with a study from Tanzania by Tumaini et al. which indicated similar mean age of their study participants; with 50% of the population being males(46). The most prevalent diagnoses were diabetes mellitus, hypertension, and chronic kidney disease. In Burkina Faso Lankoande et al. in their study in 2018 had similar findings showing that the mean age was 71 years, most being males, with hypertension and diabetic mellitus being common among them(32). This information is also supported by Wilson et al. in their 2021 study which indicated the mean age to be 70.2 years with 62% being males(8). Hypertension diabetic mellitus and ischemic heart diseases were the common diagnosis(8). The findings' similarities may be due to closely related life expectancy in low-income countries as compared to high-income countries and the high prevalence of non-communicable diseases in advanced ages. Therefore, geriatric individuals need to be oriented towards regular follow-ups and routine screening to recognize the emergency factors linked to these chronic diseases.

We found that antibiotics were prescribed by 53.1% among geriatrics during the management despite only 26.2% of them having diagnosed with infections. This is high prevalence in comparison to that doscumented by Katyali et al 2023, which indicated the prevalence of 47% and by Khalfan et al 2022 which showed the prevalence of 46.4%(47). The difference may be due to underutilization of diagnostic tools with empirical prescription being high in the list. Also is higher as compared to what has been documented by Okoro et al 2019 in Nigeria which indicated a prevalence of antibiotics prescription of 46.9% with a reason being taking more than 4 medication increasing the risk of exposure to antibiotics among geriatrics(48). Global Point Prevalence Survey (G-PPS) on antimicrobial use and stewardship in Ghana, Uganda, Zambia, and Tanzania Hospitals documented a closer lower prevalence of 50%(49). If compared to high income countries where Taxifulati et al 2021 in China indicated a prevalence of 11.8%(50). The difference may be due presence of antibiotic

monitoring and surveillance, better infection control measures, strict regulations and guildeline on antibiotics use and practicing delayed antibiotic prescription strateges to promote rational antibiotic use(51).

We also found that AMS was highly associated with in-hospital mortality. This finding is also found within QSOFA score, however the high prevalence of neurodegenerative and neurocognitive dieases in geriatrics affect its validity, also is found in APPACHE II but this has been validated in ICU not yet at EMD population(52). The findings are supported by Manji et al. 2022 in Tanzania which showed that altered mental status was associated with high mortality among those patients with advanced age(53). Another support to our study findings is by Harrington et al 2015 in Malawi which found that AMS was significantly associated with high mortality in geriatric patients(54). The findings are also similar to a review by Xiao et al. 2012 in which they found that altered mental status was a major cause of death in geriatrics above 60 years (53). Also McCabe et al. 2015 in a review indicated that altered mental status was diagnosed as delirium and it was associated with high mortality in those presenting with EMD(15). Studies show similarities because of the same baseline group of study participants within sub-Saharan Africa from similar settings. Therefore, there is a need to develop a useful tool for an approach to altered mental status in geriatric patients presenting to the EMD.

However, we discovered that DIB and oxygen saturation were major predictors of mortality in geriatric medical patients**.** These findings were in line with research done by Bose and Kosuri 2021, showing that the most common presenting complaint and cause of death was difficulty in breathing(8). Also, it is consistent with another study from a non-African country by Johnson et al, 2016 in the US which showed that difficulty in breathing was a component of the last common pathway at the end of life, as evidenced by the higher prevalence before death(38). The findings similarities can be explained by prevalence of respiratory infections among geriatric individuals with reduced physiological reserves. Because this symptom is linked to a poor prognosis, its existence should be methodically recognized, evaluated, and controlled to guarantee the best possible symptom management and
appropriate care planning.

Furthermore, findings from our study indicated that electrolyte imbalance was an independent predictor of mortality, implicated in 17.0% of deaths. This is similar to a study by Ionone et al. 2021 in Greece which indicated that electrolyte imbalance specifically hyponatremia at admission was associated with 17.4% of mortality compared to non-hyponatremia subjects (55). Also, the findings are supported by a study from Germany by Grundman et al. 2016 which showed that electrolyte disorders were prevalent and increased mortality in geriatric patients(56). Furthermore, Otterness et al. 2023 in the US, showed that high mortality in geriatric patients with electrolyte imbalances is not clear whether is from electrolyte itself or the underlying comorbidities(57). Our findings are also in line with prior research in the literature by Brouns et al. 2014 in the Netherlands, which indicated that geriatric individuals are especially vulnerable to hypernatremia since it is more common in those with reduced thirst or limited access to water (58). Conversely, geriatric people were also more likely to experience hyponatremia because of concomitant conditions (heart failure, renal insufficiency, etc.), the use of diuretics, and the syndrome of inadequate antidiuretic hormone (58). However, our study documented electrolyte imbalances in general which might have different outcomes when each electrolyte is considered separately. Therefore, relevant electrolyte changes should be ruled out in all elderly individuals since electrolyte imbalances are common in the geriatric population and can exacerbate geriatric symptoms and frailty.

Strength of the study

This was a prospective study with two centers and consecutive recruitment of study subjects. This reduced selection bias and increased representativeness. Additionally, every study subject in this research had follow-up until 48 hours. The principal investigator performed a predictive index (PI) daily data quality assurance check on the records to make sure that the data collection process was error-free. Results can be applied broadly since the sample was typical of the population under investigation, at tertiary-level referral hospitals that receive patients from all over the country, straightforward analytical techniques were used, and the data was accurate, consistent, and dependable.

Limitation of study

The evaluation of patient profiles and comorbidities was conducted using data from study subjects, family members, or previously obtained hospital records, which may have over- or under-reported certain co-morbidities and influenced the findings.

Physician-to-physician heterogeneity in clinical decision-making may have contributed to the overall results. Management techniques and disposition were solely physician-reliant, and no active interventions were carried out. Triage system may have under or overtriaged due to atypical presentation of geriatric illnesses, cognitive impairement and multiple comorbidities. A none blinding cohort study may have affected the results because the attending physicians were aware with of our ongoing study.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

Geriatric patients managed within the resuscitation rooms of tertiary level hospitals had a higher EMD presentation and in-hospital mortality rate, multiple comorbidities, regularly taking their longstanding medications to chronic diseases, presenting to EMD with AMS, DIB, hypoxia, and electrolyte imbalances. The persistent growth in the geriatric population and their unique age-related complications continue to increase the burden on the emergency care system. Geriatric-friendly processes should be considered to ensure that geriatric patients are appropriately triaged and managed in the acute care setting, while systems need to be put in place to improve their outcomes.

6.2 RECOMMENDATIONS

Development of geriatric specific triage system to incorporate the 6-item Brief Geriatric Assessment (BGA) tool that screen to identify frail inpatients who are at risk of mortality, an Alertness, Abbreviated Mental Test, Attention and Acute changes or fluctuating course tool (4AT) or Confusion Assessment Method (CAM), a mental status screening tool for early identification of high-risk geriatric patients based on the predictors identified.

We can Introduce geriatrics early warning systems that take into account frailty, physiological reserve and the identified predictors so as to ensure close monitoring of geriatric patients with low levels of oxygen and rapid response for early intervention. There is a need to implement strong antimicrobial stewardship and surveillance in geriatric population based on the study findings. The study has raised a need for geriatric healthcare professionals to address the great and growing proportion of EMD presentations of geriatric patients. Further studies can be done on isolated electrolytes associated with mortality as this study relied only on general electrolyte imbalances.

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APPENDICES

CASE REPORT FORM ENGLISH AND KISWAHILI VERSIONS

PATIENT IDENTIFICATION AND DEMOGRAPHICS

MR Number: …….
Age.....
SEX: M or F circle one.,LIVES WITH; 1; Family, 2; Wife 3; Alone 4; Others

CO-MORBIDITIES: Hypertension / Diabetes / CKD or ESRD / Chronic Liver Disease / Malignancy /HIV /COPD/Depression/ Stroke/ Others mention……..

MEDICATION for co-morbities Mention all
……

REFERRAL STATUS
Self-referral Yes or No
Referred from: Temeke ◯ Amana ◯ Mwananyamala ◯ Other hospital .....
Other Region .....
INSURANCE STATUS NHIF ● PRIVATE INSURANCE ● NO INSURANCE ●

(TICK ON THE CORRECT CIRCLE)

VITALS SIGNS AND RBG ON ARRIVAL AND DISPOSITION FROM EMD

	TIME	SBP/DBP	HR	RR	SPO2	TEMP	RBG	GCS
ARRIVAL								
DISPOSITION								

PRESENTING COMPLAINT (AS PER OBTAINED FROM, PATIENT or PHYSCIAN IN THE ROOM)

CHIEF COMPLAINT

CHIEF COMPLAINT	TICK AS REQUIRED
FEVER	
ALTERED MENTAL STATUS	
VOMITING	
LOOSE STOOL	
VOMITING OF BLOOD	
ANOREXIA	
DIFFICULTY IN BREATHING	
BILATERAL LOWER LIMB SWELLING	

COUGH	
ABDOMINAL PAIN	
CHEST PAIN	
HEADACHE	
SYNCOPE	
CONVULSION	
DECREASE URINE OUTPUT	
INCREASED URINE OUTPUT	
AWARENESS OF HEART BEAT	
OTHER (explain here:)	

POINT OF CARE INVESTIGATIONS DONE AT THE EMD

INVESTIGATION	IF YES (value)normal or abnormal
PH	
LACTATE	
SODUIM	
POTASSUIM	
CALCUIM	
CREATINE	
UREA	
URINE DIPSTICK	
PCO2	
ANION GAP	
HCT	
HB	
POC RDT	
POC HIV	
POC ECG	
POC USS FOR DYSPNEA	
POC USS FOR HYPOTENSION	
TROPONIN LEVEL	

OTHER INVESTIGATIONS DONE(normal or abnormal)

INVESTIGATION	IF YES RESULTS
FBP	
CHEST X-RAY	
CT SCAN	
OTHERS mention (….)	
FORMAL USS	

INTERVENTION DONE

INTERVENTION	TICK AS REQUIRED
IV LINE PLACEMENT	
DEXTROSE BOLUS 50%	
CENTRAL LINE PLACEMENT	
ANTIBIOTICS GIVEN AND TYPE	
URINARY CATHETER PLACEMENT	
OXYGEN SUPPORT AND TYPE	
INOTROPE OR VASOPRESSOR	
INTUBATION DONE	
CARDIOVERSION/DEFIBRILLATION	
CPR	
OTHER MANAGEMENTS	
STOPP MEDICATION AT EMD	

Type of fluid (NS,RL, DNS,D5%,D10%)	**amount**

if inotrope or vasopressor used, please fill in below table

Type of inotrope or vasopressor	**peripheral or central line used**	**amount given**
Norepinephrine		
Dopamine		
Dobutamine		
Epinephrine		

Length of stay in EMD (HRS/ MINUTES) ……
EMD Diagnosis at disposition:
1……
2…….
3……...
4……
5……
Disposition point: Tick one
Home, ICU, Cardiac Unit, Theatre, Normal ward; Other……

Outcome during hospitalization

Outcome	Alive	Dead
Emergency department		
General ward		
EMD LOS		

Date of admission to the ward; ……
Date of discharge or death…….

KISWAHILI VERSION
TAARIFA BINAFSI ZA MGONJWA

Namba ya usajiri: ……. Umri .....
Jinsia Me or Ke Zungushia moja.,Unaishi na nani?; 1; Familia, 2; Mke/Mme 3; Peke yako 4; Mwingine mtaje……

MAGONJWA: Shinikizo la damu / kisukari / Figo kushindwa kufanya kazi / ugonjwa wa ini / Saratani /UKIMWI /Mapafu/sonona/ kiharusi/ mengineyo yataje……..

DAWA unazotumia kwa magonjwa hayo hapo juu; zitaje zote
…….

RUFAA
Unayo barua ya rufaa? ndiyo au hapana
Kama ndiyo kutoka;Temeke ◯ Am◯ Mwananyamala ◯ hospitali nyingine .....
Mikoa mingine .....
TAARIFA ZA BIMA NHIF ● Bima binafsi ● Sina bima ●

(WEKA ALAMA YA TIKI PANAPOHUSIKA TUU)

DALILI ZA UGONJWA KAMA ZILIVYOCHUKULIWA KWA MGONJWA AU ZILIVYOTAJWA NA MGONJWA

DALILI	WEKA TIKI
HOMA	
KUCHANGANYIKIWA	
KUTAPIKA	
KUHARISHA	
KUTAPIKA DAMU	
KUKONDA	
KUBANWA PUMZI	
MIGUU KUVIMBA	
KUKOHOA	
TUMBO KUUMA	
KIFUA KUUMA	
KICHWA KUUMA	
KUZIMIA	
DEGEDEGE	
MKOJO UMEPUNGUA SANA KUTOKA	
IMMKOJO UMEONGEZEKA SANA KUTOKA	
MAPIGO YA MOYO KWENDA KASI	
NYINGINEZO ZITAJE _____	

Consent form (English and Kiswahili)

STUDY TITLE:

FORTY-EIGHT HOURS IN-HOSPITAL MORTALITY RATE AND ITS PREDICTORS AMONG GERIATRIC PATIENTS PRESENTING TO EMERGENCY MEDICINE DEPARTMENT OF MUHIMBILI NATIONAL HOSPITAL UPANGA AND MLOGANZILA CAMPUS

Introduction

Greetings. I, Dr. Bahati James am a second-year resident undertaking an Emergency Medicine course at Muhimbili University of Health and Allied Sciences (MUHAS).

I am currently conducting a study titled above as part of my study requirements. I hereby request your participation and support in my study once I or my research assistant approach you. Your choice to participate or not will have no effect on your care or the care and management of your beloved one. Please you may ask questions, at any time if you do not understand anything patterning this study.

Aim of the study

The purpose of this study is to determine the death rate and risk factors among geriatric patients attending to Emergency Department of Muhimbili National Hospital

Benefits

No payment or other compensation will done for your participation in the study as personal however will be beneficial for the hospital and general population who attend healthcare systems

Risks

No intervention will be done in this study putting risk into participants.

What does this study involve?

This study involves the research assistant or principal investigator asking structured questions to you, the patient, or relatives and filling the responses in the prepared questionnaire. Also, some information about you will be obtained from your hospital file.

Consent

Your consent to be enrolled in the study is entirely voluntary and amenable by signing the consent form. You are free not to consent and this will not affect the care and management offered to your patient. You may decide on to stop participating in this study at any time for any reason.

Confidentiality

The information you provide is extremely respected and will be preserved strictly confidential. The study information will be stored in protected computer files and paper records stored in a locked filing cabinet. Only study staff will have access to the information.

By signing this form, you allow the research team to use the information and give it to others involved in the research. The research team includes the researcher, facilitators plus others working on this study at MUHAS and EMD-MNH.

For further information, questions or queries, you can contact:

1. Principal Investigator,

Dr. Bahati James
Department of Emergency
Medicine MUHAS,
P. O. Box 65001,
Dar Es Salaam,
Tanzania.
0753159659
Email: jamesbahati668@gmail.com

Or

Dr. Nahya Salim Masoud
Chairman of Research and Publications Committee,
Muhimbili University of Health and Allied Sciences
P.O.Box 65001
Dar Es Salaam
Telephone +255-22-2152489
Signature:

Consent Form (Swahili Version)

FOMU YA RIDHAA YA KUSHIRIKI KATIKA UTAFITI

Utangulizi; Habari!

Jina langu naitwa Dkt. Bahati James, mwanafunzi wa mwaka wa pili wa udaktari bingwa wa magonjwa ya dharura (Emergency Medicine) katika Chuo Kikuu Cha Afya na Sayansi Shirikishi Muhimbili (MUHAS). Ninaomba ushiriki wako au kwa niaba ya mgonjwa wako kushiriki katika utafiti huu endapo mimi ama msaidizi wangu atakapokufikia ili kukuuliza taarifa muhimu za mgonjwa wako.

Lengo la utafiti huu; Ni kufahamu idadi ya vifo vinavyotokea ndani ya hospital na sababu ya vifo hivyo kwa wazee wenye umri wa miaka 60 au Zaidi wanaohudumiwa idara ya magonja ya dharura katika hospitali ya Taifa Muhimbili Upanga na Mloganzila

Hatari: Hatutarajii kuwepo na athari/hatari yeyote itokanayo na ushiriki katika utafiti huu.

Faida za utafiti: Ushiriki wako ama Ridhaa ya mgonjwa wako kushiriki katika utafiti huu, utawezesha kujua idadi ya vifo na sababu zinazoleta vifo kwa wazee wanaohudhuria idara ya magonjwa ya dharura ili kuandaa njia bora ya kuwahudumia wagonjwa wazee wanaofika kupata huduma za dharura

Usiri: Taarifa zote zitakazokusanywa katika utafiti huu zitakuwa siri, hivyo ushiriki wako hautajulikana na mtu asiye husika na utafiti bali timu ya watafiti tu.

Malipo: Kwa kushiriki kwenye utafiti huu, hautalipwa wala hautalipa ghrama yeyote ushiriki wako ni wa hiyari na hautachelewesha ama kuingilia aina ya matibabu utakayopewa.

Ukiwa na swali au tatizo lolote, unaweza kuwasiliana na wafuatao:

Mkuu wa Utafiti Dkt.Bahati James Msige

Idara ya Magonjwa ya Dharura (Emergency Medicine),

MUHAS,

S.L.P 6501,

Dar es Salaam, Tanzania. Simu: 0753159659

Barua pepe: jamesbahati668@gmail.com

AU

Dr. Nahya Salim Masoud
Mwenyekiti wa kamati ya Mapitio ya Tafiti
MUHAS,
S.L.P 65001
Dar Es Salaam
Simu namba +255-22-2152489

Kuweka sahihi ya makubaliano:

Mimi, _____nimesoma/nimesomewa maelezo yote yaliyomo kwenye fomu hii na nimeelewa. Maswali yangu yamejibiwa vizuri na niko tayari kushiriki. Sahihi ya mshiriki _____

Sahihi ya Mtafiti _____Tarehe ___

ETHICAL CLEARANCE FORMS

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/1932

Date: 03/10/2023

MUHAS-REC-10-2023-1932
BAHATI JAMES
SCHOOL OF MEDICINE
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: IN-HOSPITAL MORTALITY RATE AND ITS PREDICTORS AMONG GERIATRIC PATIENTS PRESENTING TO EMERGENCY MEDICINE DEPARTMENT OF MUHIMBILI NATIONAL HOSPITAL (UPANGA AND MLOGANZILA CAMPUS)

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 03/10/2023
EXPIRATION DATE OF APPROVAL: 03/10/2024

STUDY DESCRIPTION:
Purpose:

The purpose of this prospective observational cohort study is to determine the inhospital mortality rate and its predictors among geriatric patients presenting to EMD of MNH Upanga and Mloganzila campus

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2014801.pdf and in the MUHAS archives

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud.
Chairperson, MUHAS Research and Ethics Committee



THE UNITED REPUBLIC OF TANZANI

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote;

Ref. No.: MNH/CRTCU/Perm/2023/532 Date: 20th October 2023

Head of Department
Emergency Medicine
Muhimbili National Hospital

RE: DATA COLLECTION PERMIT AT MNH.

Name of Student	**Bahati James**
Title	**"In Hospital Mortality Rate and Its Predictors Among Geriatric Patients Presenting to Emergency Medicine Department of MNH". (Upanga and Mloganzila)**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Dr. Said Kilindimo (MUHAS)
Co – Supervisors	Dr. Simbila Alphonce (MNH)
Period	20th October, 2023 to 30th January, 2024

Approval has been granted to the above principal investigators to collect data at MNH. Dissemination of study findings at MNH shall be overseen by **Dr. Simbila Alphonce** (MNH) supervisor.

Kindly ensure the named principal investigator abide to the ethical principles and other conditions of the research approval.

Sincerely,

Dr. Jessie Mbwambo
Head of Clinical Research, Training and Consultancy Unit

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT
P. O. Box 65000
DAR-ES-SALAAM
MUHIMBILI NATIONAL HOSPITAL

c.c DMS
c.c Dr. Simbila Alphonce
c.c Bahati James

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